Annual Index to ELECTRICAL ENGINEERING for Volume 82, 1963

This section contains complete multientry indexes covering the contents of *Electrical Engineering* for the calendar year 1963. It includes all special articles and authors, all news items, and all items published on IEEE technical program papers. A technical program paper will be listed as (63-000).

The contents are arranged according to **Subject** and **Author Index** listing articles and authors; **News Index** listing all items that appear in IEEE on the Move and Progress in Technology sections, with a **Biographical Index** of news items on IEEE members.

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formers in series. A novel type of leakage inductance is introduced. The characteristic problem in analysis of drag cup rotor motors by field theory is that field equations appear with different coefficients and coordinates in sleeve and web section. By solving for both sections separately and synthesizing the complete field pattern, an equivalent circuit is derived similarly as with sleeve motors. Hence, performance characteristics can readily be computed.

CP63-1057. **Post-Irradiation Reliability of Transistors,** *L. B. Gardner, J. R. Coss.* Selected transistors were divided into two groups: one which was exposed to steady-state mixed neutron and gamma radiation to a total dose of approximately 3.3×10^{13} *nv.t;* the other group, not exposed to radiation, served as a control. The devices in each group consisted of the same semiconductor chip type but of different can size. After exposing the one group to radiation, both groups were life tested. The life test was at maximum power dissipation. During the test, the transistor's beta and leakage current were measured for all devices. The results of this study show two hitherto unpublished facts: first, that the application of power to the devices that were irradiated, acted as a catalyst for the annealing of their radiation-induced damage; and, second, that in certain cases, there is an unexplained acceleration in device failure rate.

CP63-1070. **Experience with 15-Kv Aluminum Conductor PILC Cable in Toronto,** *B. L. Brenner.* An installation of 46,000 feet of 500-mcm three-conductor aluminum, 15-kv PILC cable is described. Two methods of connecting the aluminum conductors are detailed, one being a solder-basting technique and the other the use of aluminum compression sleeves. Faults which occurred in service are discussed. The results of laboratory tests are presented which indicate that high-resistance joints resulted from applying aluminum compression sleeves to conductors covered with high-viscosity cable oils containing additives of rosins, wax, or viscous polymers.

63-1077. **A Guide to Transmission Structure Design Loadings, Part I: Review of NESC Development,** *F. W. Farr, C. M. Ferguson, N. J. McMurtrie, J. R. Steiner, H. B. White, E. S. Zobel.* The general history of transmission line design is given to provide a background in establishing the purpose and intent of the National Electric Safety Code. The evolution of loading assumptions and associated structural safety factors as used by engineers and specified by various associations are compared with those requirements of the various editions of the NESC. In addition, the background of the original requirements and the philosophy associated with subsequent modifications of the code are given to provide a better understanding of the present requirements.

CP63-1078. **A Guide to Transmission Structure Design Loadings, Part II—Vertical Loadings,** *F. W. Farr, C. M. Ferguson, N. J. McMurtrie, J. R. Steiner, H. B. White, E. S. Zobel.* The transmission tower is subjected to a variety of vertical loads which should be evaluated during the development of a new design. The proper vertical span needs to be based upon the local terrain. Various ice loadings must be coordinated with local weather data and observations. In addition, construction and maintenance procedures may produce a critical vertical load. Designing for larger vertical loads usually requires only a minor and inexpensive structural modification.

CP63-1081. **Transient Radiation Effects in Simple Triode Amplifiers,** *P. A. Trimmer.* Data for transient radiation effects were obtained on potted and unpotted simple triode amplifiers. From the magnitude and polarity of the observed transient output voltages, equivalent input currents were calculated. Some possible sources of these transient voltages are radiation-produced leakage currents in the media surrounding the amplifier or in the support structure themselves and from electrons being scattered out of circuit components. Experimental techniques are discussed, and a brief description of the pulsing reactor used for these tests is given.

CP63-1095. **Lakeview Generating Station—Electrical Design Features,** *R. J. Ross, W. G. Eriksen.* An outline is given of the principal design features of the electric power systems of the first four units in a thermal generating station expected to have a total capacity of 1,800 Mw from six 300-Mw units. The features described include the main power output systems, the a-c and d-c station service systems, the control room, cable and cable pans, station grounding, and station lighting. Differences in design between units 1 and 2 and units 3 and 4 are shown to be due primarily to changes in equipment suppliers and in design philosophy. The latter changes have resulted from experience gained from units 1 and 2 and from the fact that the need for special precautions to ensure the security of the station service supply decreases as the number of units increases.

CP63-1099. **A Method of Correcting Scheduled Operation with Forecast Error in the Economic Operation of an Electric Power System,** *K. Hara, M. Kimura, N. Honda, J. Oizumi.* In the economic operation of a hydro-thermal electric system, it becomes an important problem to correct the scheduled operation according to the variations of total system load and inflows from the forecasted values. A method is described of correcting the scheduled operation on the basis of Euler's differential equation. According to this method the optimum operation for the variations can be easily obtained from the results of schedule calculation.

Science and Electronics

CP63-712. **Application of Centralized Remote Control Equipment to Primary Electrical Substations Supplying Richland Reactors and Production Facilities,** *63 Electro-Nuclear Conference Nucleonics Committee.* A description of the primary power supplies to the reactor areas and a discussion of their reliability are given. Normal and emergency duties of a primary substation operator are noted and a comparison between manned and remote controlled operating responses is made. It is indicated that application of remote control equipments to these power supplies is practical and justified. Detailed functional requirements, acceptable methods of operation, and quality of remote control equipments for this application are outlined.

CP63-953. **Dynamic Radiation Evaluations of Passive Components in Combined Environments,** *I. Doshay.* Factorially designed experiments are devised to determine electrical performance characteristics of passive component parts under load while being exposed to various levels of radiation, simultaneously in a vacuum. The experiment design includes sufficient samples, types, and load conditions for high confidence conclusions. Two useful mechanisms of ionizing radiation effects are discovered. The first is a bias effect which opposes ionizing radiation degradation and the second is a saturation effect which limits change in capacitance deviation and dissipation factor with respect to increase in dosage. A number of characteristics curves of radiation degradation for film resistors and solid tantalum capacitors are included.

CP63-1079. **Mathematical Models for Reliability Testing in a Nuclear Radiation Environment,** *T. Johnson.* Two mathematical models are proposed for use in planning and analysis of radiation effect experiments. The exponential failure law is shown to give a more conservative estimate of the reliability than the Weibull failure law, with Weibull slope parameter greater than one, for any given experimental result and any reliability greater than 0.368. The confidence statement for the exponential law is given and the meaning and use of confidence statements are criticized. A method is developed for making a true probability statement of reliability from experimental results on a Weibull population. An example is given to compare the method of estimating the mean time to failure with the method of direct probability statement for an exponential population.

CP63-1083. **Thermal Impedance Measurements on Single Junction Semiconductor Devices,** *W. D. Russell.* A method has been developed whereby the junction temperature of any semiconductor device may be determined under a given set of conditions. In this method, measuring and heating currents flow through the same junction. By measuring the temperature of the encapsulation or heat sink by other means, a thermal impedance can be determined, usually accurate within 10 per cent compared to other methods, and reproducible to within 5 per cent. No heat sinks are necessary and assumptions concerning transient thermal time constants do not enter into the calculations. Examples and a circuit diagram are shown.

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